

Japan's Policy on Energy Conservation

Hidemasa Nishiyama

International Affairs Office,
Energy Conservation and Renewable Energy Dept.
Agency for Natural Resources and Energy

Energy Policy

MILESTONES

Within 3
Years

- Introduce renewable energy and enhance energy efficiency to the maximum extent for the next 3 years
- Restart nuclear power plants, once their safety is assured by the NRA (Nuclear Regulatory Agency)

Within 10
Years

- Establish the best long-term mix of power sources.

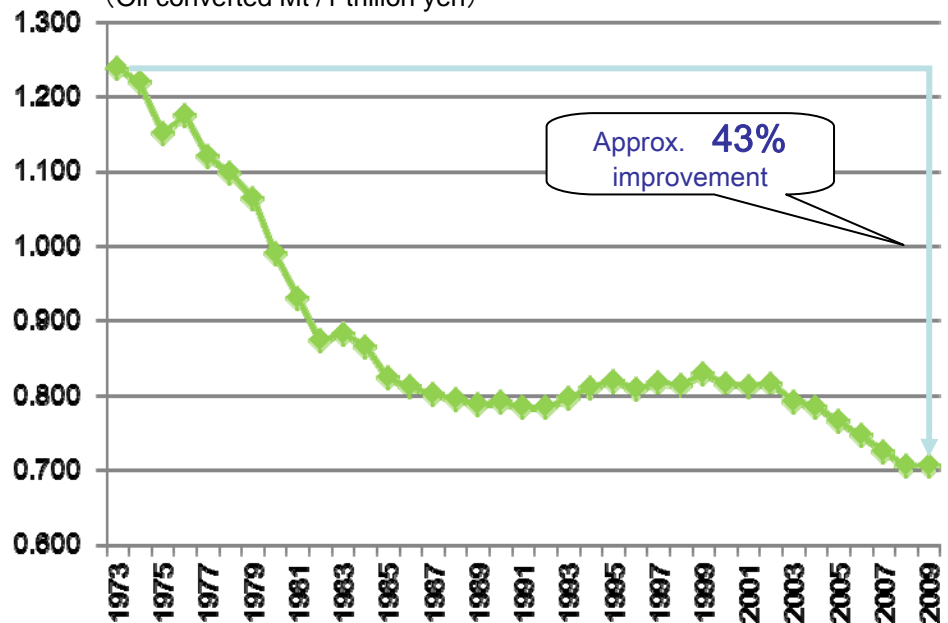
Energy Efficiency

Energy Conservation Efforts of Japan after Oil Crises

- Japan has been improved energy efficiency by **about 40% after the oil crises since 1970s** as a result of positive action by both public and private industrial sectors.
- Japan intensively introduced "**Energy Management system based on Energy conservation law**", then realized the lowest energy consumption per GDP.

Primary energy use per real GDP of Japan

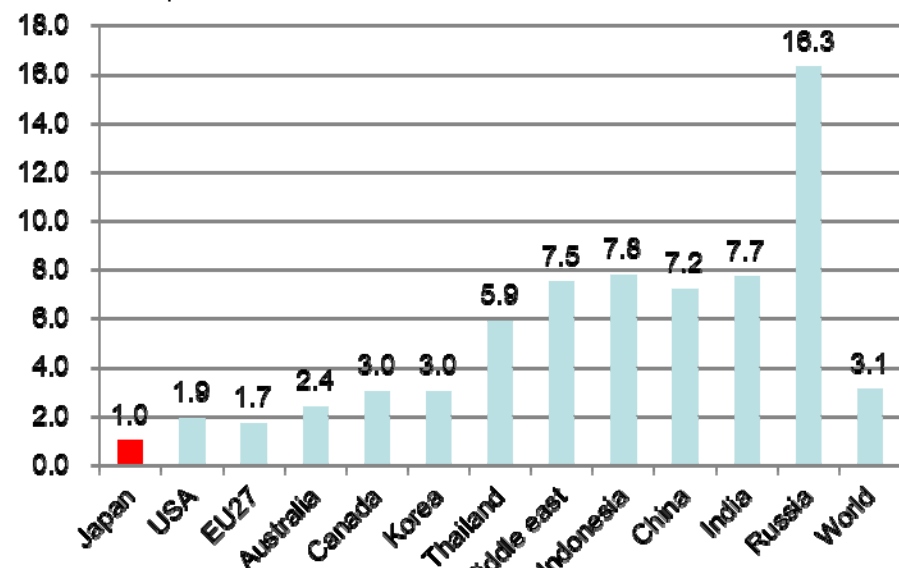
(Oil converted Mt / 1 trillion yen)



Source) Total Energy Statistics by ANRE/METI

Primary energy supply per GDP unit of each country (2009)

(Index : Japan=1.0)



Calculated according to IEA statistics



Japan's Energy Efficiency Policy

1. Regulation

Energy Conservation Law : Enacted in **1979**

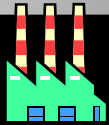
→ Upgraded and improved several times
responding to social needs

2. Promotion

- Tax incentives
- Subsidies (including for R&D)
- Preferential interest rate

3. Voluntary action (by private sector)

Historical Development of Energy Conservation Law



Industry

1947 Establishment of heat management

1979 Establishment

- Designated Energy Management Factories
- Guidance for Buildings and Appliances

Effective use of electric power and fuel in industrial sector

- 1983 Amendment
- Licensed energy manager system

- 1993 Amendment
- Periodical reporting

- 1998 Amendment
- Expand coverage of factories

- 2005 Amendment
- Integration of Heat and Power Control

- 2008 Amendment
- Company based regulation include franchised chains

- 2012 Amendment
- Measures on demand side at peak demand hours
- Top Runner Program for Building Materials etc.



Residential Commercial



Transportation



Promote energy efficiency of automobiles and household electrical appliances

- 1998 Amendment
- Top Runner Program for automobiles and household electrical appliances

- 2002 Amendment
- Energy Management of Office Buildings

- 2005 Amendment
- Reporting System on Energy by Carriers

Japan's Energy Efficiency Policy

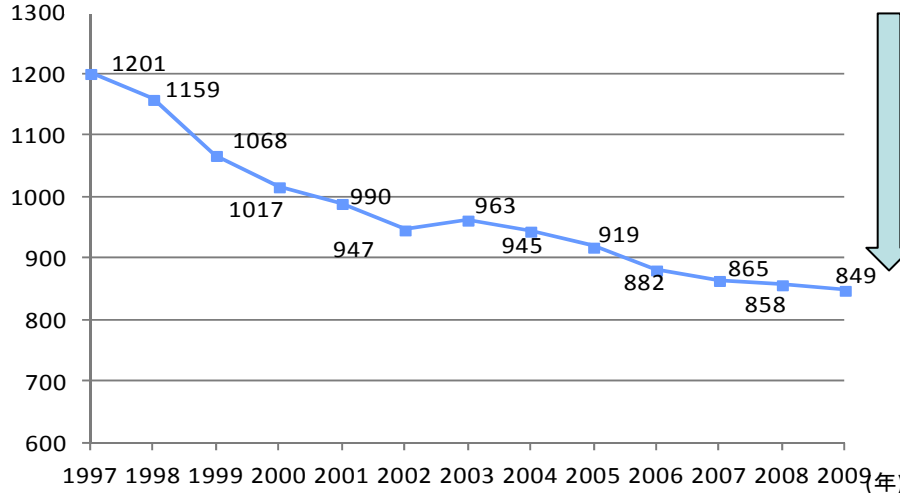
<Regulations>

Automobiles/Electronic Appliances

- **“Top Runner”** Program
Target products : **23** products



Average electricity consumption of air conditioner (kW)



30% improvement



SETSUDEN (power saving) Campaign, Summer 2011

(1) Large users (contract electricity > 500 kW)

- Every large user to map out and implement their own plan
- Mandatory demand restriction by the Electricity Business Act (Art 27)

(2) Small users (contract electricity < 500 kW)

- To map out specific targets and voluntary plans according to the business type
- The government conducted awareness campaigns and individual visits using “Standard Format for Action Plan of Electricity Saving”

(3) Households and individuals

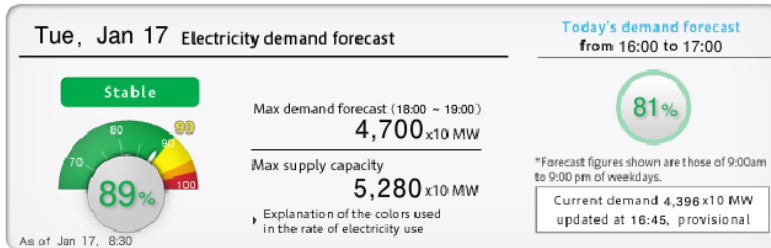
- Government provided “Menu of Electricity Saving Measures by Households”
- “Electricity Saving Manifesto by Households” on the website prepared by the government
- Promote energy saving through education

(4) Nation-wide activities

- Providing electricity supply-demand forecast.
- “Tight Supply-Demand Alert” and announcement of the possibility of rolling blackout – announce to individual cell-phone

SETSUDEN (power saving) Campaign, Summer 2011

○Electricity demand forecast



○Ad on newspaper



○Menu of Electricity Saving by Households

項目	削減率
冷蔵庫の扉を閉めっぱなし	10%、130kWh
エアコンのフィルター掃除を定期的に行う	10%、130kWh
洗濯機を乾燥モードで運転する	50%、600kWh
洗濯機を乾燥モードで運転する	2%、25kWh
洗濯機を乾燥モードで運転する	5%、60kWh
洗濯機を乾燥モードで運転する	2%、25kWh
洗濯機を乾燥モードで運転する	2%、25kWh
洗濯機を乾燥モードで運転する	2%、25kWh
洗濯機を乾燥モードで運転する	2%、25kWh

○Standard Format for Action Plan

オフィスビルの節電行動計画フォーマット

● 短期の節電対策の目標 (分野別の削減目標)

● オフィスビルの節電消費の特徴

● 電力消費の内訳 (ピーク時)

○Electricity Saving Manifesto by Households

鈴木さんの節電宣言

我が家の節電実績

7% 8% 9%

目標 7%

達成率 85%

目標達成まであと 0.15%

達成率 0.15%

目標達成まであと 0.15%

Summary of Electricity Supply-Demand Measures after the the Great East Japan Earthquake

1. Rolling Blackouts just after the Great East Japan Earthquake

- Because a possible 10 million kW shortfall (equivalent to 24% of demand supply capability) within the service area of TEPCO, we implemented a series of rolling blackouts during weekdays from March 14- 28 days over ten days)

2. Power Saving Request and Mandatory Demand Restriction by the Electricity Business Act (Art 27) for summer 2011

- We requested to the service areas of Tohoku, Tokyo and Kansai reduce consumption based on numerical targets.
- Furthermore, we announced Mandatory Demand Restriction by order of the Electricity Business Act (Art 27) for Tohoku and Tokyo because of the large gap between demand and supply.

	Hokkaido	Tohoku	Tokyo	Chubu	Kansai	Hokuriku	Chugoku	Shikoku	Kyushu
Request Power Saving	(none)	▲15% + Art27	▲15% + Art27	—	▲10%※	—	—	—	—

※To preserve industrial production capacity

3. Power Saving Request for winter 2011

- We requested to the service areas of Tohoku, Tokyo and Kansai to reduce power consumption based on the following numerical targets.

	Hokkaido	Tohoku	Tokyo	Chubu	Kansai	Hokuriku	Chugoku	Shikoku	Kyushu
Request Power Saving	—	—	—	—	▲10%※	—	—	—	▲5%※

※To preserve industrial production capacity

Summary of the electricity supply-demand measures after the Great East Japan Earthquake

4. Request for electricity saving for summer in 2012

- Requested users in Hokkaido / Central and West Japan (in terms of regional allocation) to save electricity with targets
- Saving electricity target was mitigated after Oi Nuclear Power Plant, Units 3 and 4 were restarted.
- In Hokkaido, Kansai, Shikoku, Kyushu rolling blackouts were planned (but not implemented) .

	Hokkaido	Tohoku	Tokyo	Chubu	Kansai	Hokuriku	Chugoku	Shikoku	Kyushu
Original	▲7%	—	—	▲5%	▲15%	▲5%	▲5%	▲7%	▲10%
Unit3 Restarted	▲7%	—	—	▲4%	▲10%	▲4%	▲3%	▲7%	▲10%
Unit4 Restarted	▲7%	—	—	—	▲10%※	—	—	▲5%	▲10%

※ ▲5% in interference of production activity

5. Request for electricity saving for winter in 2012

- All electricity companies are expected to maintain their necessary reserve rate (3% at least)
- On the other hand, due to the limitation of allocation capacity in Hokkaido areas, a 7% electricity saving target was requested in Hokkaido to avoid rolling blackouts in winter

	Hokkaido	Tohoku	Tokyo	Chubu	Kansai	Hokuriku	Chugoku	Shikoku	Kyushu
Request power saving	▲7%※	—	—	—	—	—	—	—	—

※ 「—」 means general request for electricity saving without targets

Electricity Supply and Demand Outlook for this Winter

Outlook for this winter (incorporating the actual decline this summer in the reasonably anticipated reduction in power consumption and presuming that this winter will be as severe as in FY2011)*

* For HEPCO service areas, as severe as the especially severe winter in FY2010

January

Supply capacity of Kyushu Electric Power Co., Inc. includes power interchange from other power utility companies (Chubu and Chugoku).

(10,000kW)	East 3	Hokkaido	Tohoku	Tokyo	Central/ West 6	Chubu	Kansai	Hokuriku	Chugoku	Shikoku	Kyushu	Total of 9 companies
Supply capacity	7,534	601	1,505	5,428	9,017	2,480	2,670	557	1,165	556	1,589	16,551
Peak demand	7,021	563	1,408	5,050	8,566	2,367	2,537	519	1,096	510	1,537	15,587
Supply – Demand (Reserve margin)	513 (7.3%)	38 (6.7%)	97 (6.9%)	378 (7.5%)	451 (5.3%)	113 (4.8%)	133 (5.2%)	38 (7.3%)	69 (6.3%)	46 (9.0%)	52 (3.4%)	964 (6.2%)

February

(10,000kW)	East 3	Hokkaido	Tohoku	Tokyo	Central/ West 6	Chubu	Kansai	Hokuriku	Chugoku	Shikoku	Kyushu	Total of 9 companies
Supply capacity	7,597	596	1,477	5,524	9,050	2,524	2,642	562	1,181	557	1,584	16,647
Peak demand	7,005	563	1,392	5,050	8,566	2,367	2,537	519	1,096	510	1,537	15,571
Supply – Demand (Reserve margin)	592 (8.5%)	33 (5.8%)	85 (6.1%)	474 (9.4%)	484 (5.7%)	157 (6.6%)	105 (4.1%)	43 (8.3%)	85 (7.7%)	47 (9.1%)	47 (3.1%)	1,076 (6.9%)

Risks of unexpected shutdowns of power plants in HEPCO service areas

Fiscal year	Largest shutdown	Annual average
FY2011	0.96 million kW	0.31 million kW
FY2010	1.37 million kW*	0.36 million kW

*Maximum value in the last 15 years

Fiscal year	Largest shutdown	Annual average
FY2009	1.32 million kW	0.27 million kW
FY2008	1.15 million kW	0.35 million kW
FY2007	1.28 million kW	0.38 million kW

Electricity Supply and Demand Measures for this Winter

	Hokkaido	Tohoku	Tokyo	Chubu	Kansai	Hokuriku	Chugoku	Shikoku	Kyushu
Request for general power conservation (ensuring reasonably anticipated reduction)	Dec. 3 – Mar. 29 (9:00 – 21:00) (8:00 – 21:00 in the service areas of HEPCO and of Kyushu Electric Power Co., Inc.) * Due consideration should be given to vulnerable people, such as elderly people and those in earthquake-stricken areas.								
Reasonably anticipated reduction for this winter (compared to FY2010)	- 3.3%	- 2.2%	- 5.0%	- 2.8%	- 5.6%	- 3.4%	- 1.5%	- 5.2%	- 4.5%
(1) Request for power conservation with a numerical target (compared to FY2010)	-7% or more* Dec. 10 – Dec. 28 (16:00 – 21:00) Jan. 7 – Mar. 1 (8:00 – 21:00) Mar. 4 – Mar. 8 (16:00 – 21:00)	—	—	—	—	—	—	—	—

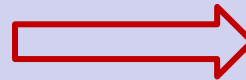


*Due consideration should be given to vulnerable people, such as the elderly and those in earthquake-damaged areas, as well as to ensuring functions of lifelines, such as hospitals and railways. Furthermore, effects on production activities (including farming and tourism) should also be taken into consideration. A reduction of 7% or more will be requested when the power supply becomes tight.

The above period excludes weekends, holidays, and year-end and new year holidays

In preparation for the possibility of power supply failure equal to or exceeding the largest-ever level

(2) Program for Emergency Adjustments to Prevent Rolling Blackouts (Appendix)



If a 0.33 million kW reduction of power demand can be ensured effectively, power supply-demand will be stable even in the event of power supply failure equal to the largest-ever level (-1.37 million kW).

(3) Bidding for Negawatts during emergencies, etc.



Response to any risks larger than the above

(Appendix) Program for Emergency Adjustments to Prevent Rolling Blackouts

- (i) If any power failures, including rolling blackouts occur in Hokkaido during severe winter weather, it may pose a direct danger to the lives and safety of Hokkaido residents, and any possibility of rolling blackouts may itself have a negative influence on tourism and other economic activities in Hokkaido.
- (ii) Therefore, in preparation even for less frequent risks, the Program for Emergency Adjustments to Prevent Rolling Blackouts should be prepared in order to avoid power failures, including rolling blackouts.
- (iii) The national government, the Hokkaido prefectural government, and HEPCO should request that large consumers in HEPCO service areas conclude contracts to join the Program for Emergency Adjustments to Prevent Rolling Blackouts.

Program content

1. Outline

In order to prevent rolling blackouts that may pose a danger to people's lives, HEPCO requests a significant reduction of demand by way of temporary suspension of production and economic activities or temporary closing of business, etc. in case of a less frequent emergency due to such causes as a large-scale shutdown of power plants.

2. Coverage

Large consumers (whose contract power consumption is 500kW or more for industry or business use)

*HEPCO will visit all relevant consumers (around 1,100) to ask for cooperation

3. Period

From December 10, 2012 to March 22, 2013 (all day)

4. Goal

To ensure that demand is reduced by at least 0.33 million kW on effective basis

Scheme

Request for cooperation from the national government, the prefectural government and HEPCO



Contract between cooperative companies and HEPCO

(In a less frequent emergency)

Power supply becomes tight (presuming the reserve margin of 1%)



HEPCO requests companies to reduce power demand

*Separately request general households, etc. to refrain from unnecessary power use



Companies reduce power demand



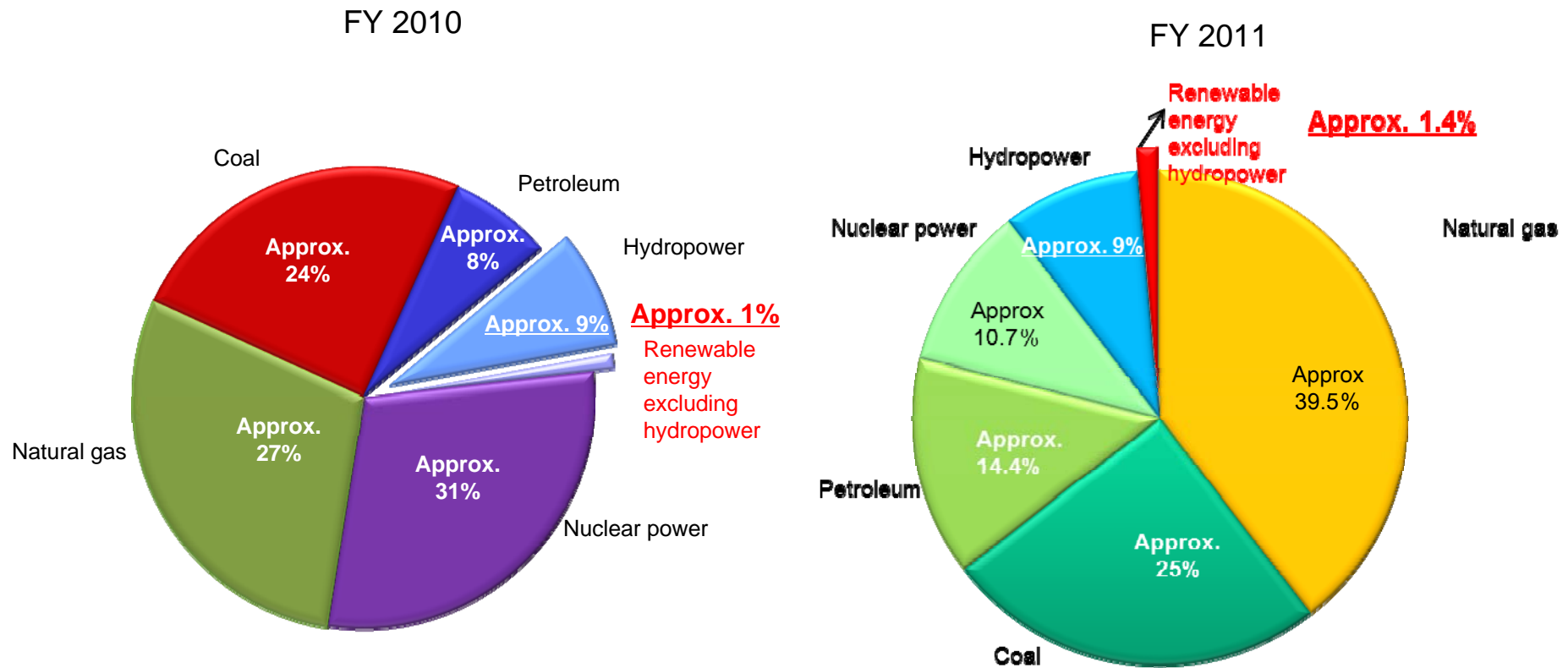
Discount of electricity rates

Renewable Energies

Current Composition of Power Sources in Japan

- Among the total electricity generated in fiscal 2010, renewable energy, etc. accounted for approximately 10%; approximately 9% of which is hydraulic power generation.
- Other renewable energy is still cost prohibitive.

Composition of annual electricity generated in Japan

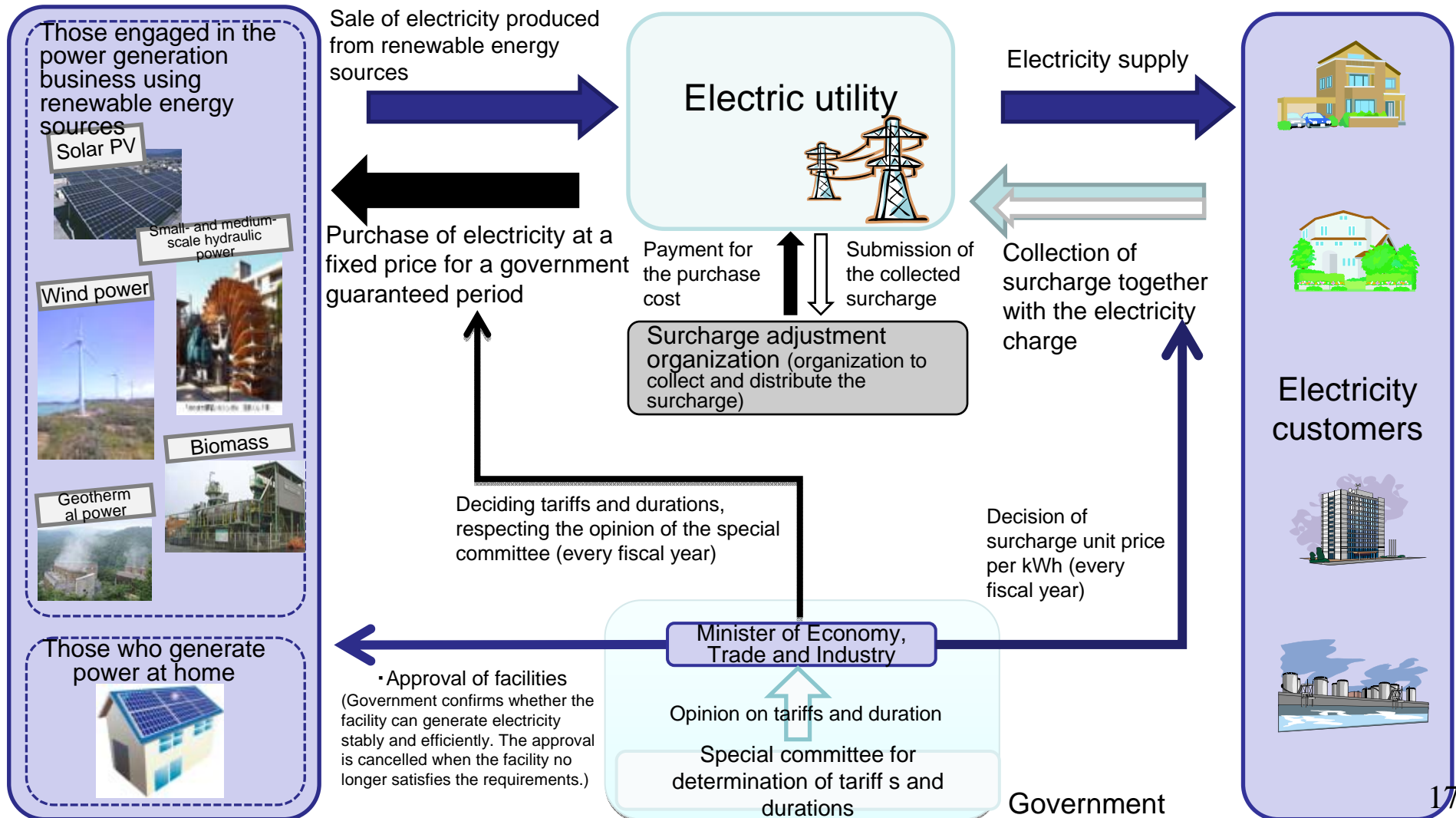


Note: "Etc." of "Renewable energy, etc." includes the recovery of energy derived from waste, refuse derived fuel (RDF) products, heat supply utilizing waste heat, industrial steam recovery, and industrial electricity recovery.

Source: Prepared based on the Agency for Natural Resources and Energy's "Outline of Electric Power Development in FY 2010"

Basic Mechanism of the Feed-in Tariff Scheme

- Under the feed-in tariff scheme, if a renewable energy producer requests an electric utility to sign a contract to purchase electricity at a fixed price and for a long-term period guaranteed by the government, the electric utility is obligated to accept this request.



Renewable Energy Forecast (FY2012)

- Estimating based on officially announced projects and recent trend, approximately 2.5GW renewable energy facilities would be installed in this fiscal year.(Current renewable energy generation capacity approx.19.45GW,expected to increase to approx.22GW.)

< Renewable energy installation situation in FY 2012(as of November) >

	Already installed capacity by FY2011	Installed capacity already operational at the end of November	Installed capacity already authorized by the end of November	Forecast of newly installed capacity in FY2012
Residential PV	Approx. 4GW	1.02GW	0.73GW	+ Approx 1.5GW (40% increase from new installation in 2011)
Non-Residential PV	Approx. 0.8GW	0.37GW	2.54GW	+Approx 0.5GW (Estimate by METI)
Wind	Approx. 2.5GW	0.01GW	0.34GW	+ Approx 0.38GW (50 % increase from recent annual installation)
Small and Medium scaled hydro (1MW to 3MW)	Approx. 9.35GW	0.001GW	0GW	+ Approx 0.02GW (Estimate by METI)
Small and Medium scaled hydro (Less than 1MW)	Approx. 0.2GW	0.002GW	0.002GW	+ Approx 0.01GW (50 % increase from recent annual installation)
Biomass	Approx. 2.1GW	0.03GW	0.04GW	+ Approx 0.09GW (50 % increase from recent annual installation)
Geothermal	Approx. 0.5GW	0GW	0.001GW	+0GW
Total	Approx. 19.45GW	1.44GW	3.65GW	+ Approx 2.5GW



International Cooperation

Cooperation on energy conservation

Purpose

To share with other countries Japan's experience of overcoming the "oil-crises" with advanced energy efficiency (EE) policies and technologies, through:

1. Cooperation on EE policies

To assist other countries in designing their EE policies and measures through such activities as capacity building and joint policy research, on the basis of Japanese policies and measures

2. Cooperation on EE technologies

To assist other countries in developing and utilizing EE technologies through such activities as joint demonstration projects, on the basis of Japanese technologies

Example of policy cooperation:

Assistance for establishment of EE measures



Cooperation with Malaysia

- ✓EE measures being discussed with energy authority staff from Malaysia
- ✓Japanese legislation, regulations, measures, etc. being introduced and studied

Example of technology cooperation

Waste heat power generation at a cement plant



Demonstration at a cement plant in China

- ✓Waste heat power generation technology was demonstrated in 1995 - 1997
- ✓The technology has been wide spread in the country after the completion of the demonstration

Cooperation on renewable energies

Purpose

To assist introduction of renewable energies (RE) worldwide, taking advantage of Japan's strength on the energy demand-supply management, through:

1. Cooperation on RE policies

To establish environments to facilitate introduction of RE worldwide through such activities as capacity building

2. Cooperation on RE technologies

To assist other countries in developing and utilizing RE technologies through such activities as joint demonstration projects, on the basis of Japanese technologies on, *inter alia*, PV and energy management

Example of policy cooperation

Assistance for establishment of RE measures



Cooperation with the Philippines

- ✓ RE measures being discussed with energy authority staff from the Philippines
- ✓ Japanese measures to promote RE being introduced and studies

Example of technology cooperation

Large scale PV system



Demonstration at an industrial park in India

- ✓ A stable power supply system using PVs is being demonstrated for the period 2012 – 2014
- ✓ The agreement to start the project was signed in front of ministers from India and Japan, which highlighted commitments of the two Gov'ts.

Multilateral cooperation (IPEEC and IRENA)

Purpose

To promote energy efficiency improvements and use of renewable energies at a global scale through active contribution to multilateral initiatives, such as IPEEC (International Partnership for Energy Efficiency Cooperation) and IRENA (International Renewable Energy Agency)

Multilateral initiative for energy efficiency

IPEEC (International Partnership for Energy Efficiency Cooperation)



- ✓ To facilitate participating countries' voluntary efforts on energy efficiency improvements through information sharing
- ✓ Established in 2009, with participation of Japan, the US, China, India and others, headquartered in Paris
- ✓ 8 WGs are established and in active operation

Multilateral initiative for renewable energies

IRENA (International Renewable Energy Agency)



- ✓ To facilitate the use of renewable energies through policy analysis, establishment of research network, etc.
- ✓ Established in 2011 with participation of 98 countries, headquartered in Abu Dhabi
- ✓ Japan has been acting as one of the Executive Members

Thank you very much!
ありがとうございます！

Questions?